

University of Puerto Rico  
Medical Sciences Campus  
School of Medicine



**Human Physiology**  
**MPRI 7120**

2011-2012

Medicine Program  
Rev 18/1/2012

**UNIVERSITY OF PUERTO RICO**

**MEDICAL SCIENCES CAMPUS**

**SCHOOL OF MEDICINE**

**Physiology Department**

**Medicine I**

**COURSE SYLLABUS**

<b>COURSE TITLE:</b>	Human Physiology
<b>DATES:</b>	February 28 to May 2, 2011 (9 weeks)
<b>CODIFICATION:</b>	MPRI 7120
<b>NUMBER OF CREDITS/HOURS:</b>	140.25 hours
<b>NAME OF COORDINATOR:</b>	Carlos A Jiménez-Rivera, Ph.D.
<b>COORDINATOR'S OFFICE:</b>	A-687
<b>COORDINATOR CONTACT PHONE:</b>	(787) 758-2525 ext. 1676
<b>COORDINATOR E-MAIL:</b>	carlos.jimenez8@upr.edu
<b>MEETING PLACE:</b>	Amphitheater I (3 <sup>rd</sup> floor)/Main Building
<b>COURSE HOURS:</b>	8:00am until 12:00n
<b>PRE-REQUISITES:</b>	None
<b>CO-REQUISITES:</b>	None

**COURSE DESCRIPTION:**

In this course, students will learn the basic concepts of Human Physiology that will enable them to make sound clinical diagnosis based on strong scientific foundations. Clinical examples are used throughout the course to make students aware of the importance of Physiology in their future medical practice. The course runs 9 weeks from February 27 to May 1, 2012 with approximately half of the time dedicated to active learning activities in the form of small group discussions, laboratories and student directed discussions.

## **COURSE JUSTIFICATION:**

This course provides first year medical students with the basic facts and principles of Human Physiology. These principles are necessary to understand the mechanisms of disease, as well as treatments for pathological conditions, such as pharmacological interventions. In this way, the students will acquire knowledge and develop the necessary skills to integrate the function of different systems (Cardiovascular, Respiratory, Renal, Gastrointestinal and Endocrine) and how they respond to a stimulus (pathological, exercise or temperature). The concepts presented in this course are, therefore, essential to the everyday practice of clinical medicine.

## **COURSE OBJECTIVES:**

### **Knowledge Objectives:**

At the end of the course the student will be able to:

1. Describe the movement of molecules across the cell membrane and its regulation.
2. Explain the morphological and functional characteristics of skeletal, cardiac and smooth muscle.
3. Classify the divisions of the Autonomic System and understand its role in the regulation of physiological systems.
4. Evaluate the main functions of the heart and blood vessels, as well as the regulation and integrative actions of the cardiovascular system.
5. Describe the organization of the respiratory system as well as its function and components.
6. Name and analyze the structural-functional relationship of the renal system and its integrative function with other organ systems.
7. Compare the physiological responses caused by acid or base disturbances.
8. Explain the components of the thermoregulation system.
9. Demonstrate the organization and function of the gastrointestinal system.
10. Describe the organization and function of the endocrine system and explain its role in regulating homeostasis of the human body.
11. Discuss the physiological adaptations and responses to exercise.
12. Recognize the interplay between genes and hormones in the expression of male and female phenotypes.
13. Describe and compare the male and female reproductive systems.
14. Evaluate how each system responds to a specific stimuli, either physical or environmental, and explain how the responses contribute to the etiology of disease.

### **Psychomotor Objectives:**

These objectives will be accomplished by participating in the laboratory activities planned for this course.

1. Acquire the skills in the correct use of basic clinical equipment, such as: use of sphyngomanometer, EKG and spiromanometer in the monitoring of the function of the cardiovascular and respiratory systems.
2. Perform practice sessions with the clinical instruments and interpret their findings in various altered states of the cardiovascular and respiratory systems.

### **Affective Objectives:**

These objectives will be accomplished by active student participation in the small group discussions scheduled for the course.

1. Develop individual and group communication skills by interacting with fellow students and observing the group dynamics.
2. Collaborate in the formulation of the problem and the problem solving by the group.
3. Express individual ideas and points of view while showing respect for that of others.

### **COURSE CONTENT AND TIME DISTRIBUTION:**

#### **DETAILED COURSE SCHEDULE**

Table of Contents:

1. Muscle Physiology
2. Autonomic System
3. Cardiovascular Physiology
4. Respiratory Physiology
5. Cell Membrane Transport
6. Renal Physiology
7. Acid-Base Physiology
8. Thermoregulatory Physiology
9. Gastrointestinal Physiology
10. Exercise Physiology
11. Endocrine Physiology
12. Reproductive Physiology

### **WEEK 1**

#### **INTRODUCTION & CELL MEMBRANE**

*MONDAY FEBRUARY 27*

- |              |                               |
|--------------|-------------------------------|
| 8:00-8:15AM  | Course Introduction (CJ)      |
| 8:15-11:00AM | Cell Membrane Physiology (NE) |

## **CELL MEMBRANE AND MUSCLE PHYSIOLOGY**

### *TUESDAY FEBRUARY 28*

- 8:00-9:00AM Cell Membrane Physiology (NE)
- 9:00-11:00AM Skeletal Muscle Mechanics (GES)
- 11:00-12:00M SDS Autonomic Nervous System (CJ)

## **CARDIOVASCULAR PHYSIOLOGY**

### *WEDNESDAY FEBRUARY 29*

- 8:00-10:00AM Introduction/ Heart Electrophysiology (GES)
- 10:00-12:00M *SDS – Na<sup>+</sup>, K<sup>+</sup> and Ca<sup>2+</sup> channels mechanisms of action*

### *THURSDAY MARCH 1*

- 8:00-9:00AM Heart Electrophysiology (GES)
- 9:00-10:00AM Fundamentals of the Electrocardiogram (GES)
- 10:00-12:00 *SDS - Cardiac Regulation (Extrinsic & intrinsic Mechanisms)*

### *FRIDAY MARCH 2*

- 8:00-10:00AM Heart Mechanics/The Cardiac Cycle (GES)
- 10:00-12:00M Laboratory – The electrocardiogram and blood pressure (Group #1)
- 10:00-12:00M *SDS Coronary Circulation and Coagulation Cascade-Group #2*

## **WEEK 2**

### *MONDAY MARCH 5*

- 8:00-9:00AM The Arterial System (GES)
- 9:00-10:00AM Cardiac Regulation (GES).
- 10:00-12:00M Laboratory – The electrocardiogram and blood pressure (Group #2)
- 10:00-12:00M *SDS Coronary Circulation and Coagulation Cascade-Group #1*

### *TUESDAY MARCH 6*

- 8:00-10:00AM Coupling of the Heart and Blood Vessels (GES)
- 10:00-11:00AM CLINICAL CORRELATION

### *WEDNESDAY MARCH 7*

- 8:00-10:00AM The Microcirculation (GES)
- 10:00-12:00AM **SGD** Case Study in Cardiovascular Physiology (Staff)

## **RESPIRATORY PHYSIOLOGY**

### *THURSDAY MARCH 8*

- 8:00-9:00AM Composition of the Air, Gas Pressure (MJC)
- 9:00-10:00AM Pulmonary Volumes and Capacities (MJC)
- 10:00-11:00AM Alveolar Ventilation (MJC)

11:00-12:00M      *SDS Surface tension and surfactant (MJC)*

### **WEEK 3**

#### ***FRIDAY MARCH 9***

8:00-10:00AM      Pulmonary Mechanics (MJC)  
10:00-12:00M      *SDS Pulmonary Mechanics (MJC)*

#### ***MONDAY MARCH 12***

8:00-9:00AM      Blood Flow and Metabolism (MJC)  
9:00-10:00AM      Gas Transport by the Blood (MJC)  
10:00-12:00M      Laboratory-Pulmonary volumes, capacities and mechanics (Group #1)  
10:00-12:00M      *SDS Obstructive and restrictive diseases (MJC) – Group #2*

#### ***TUESDAY MARCH 13***

8:00-9:00AM      Shunts in the Pulmonary System (MJC)  
9:00-10:00AM      Ventilation/Perfusion Relationships (MJC)  
10:00-12:00M      Laboratory-Pulmonary volumes, capacities and mechanics (Group #2)  
10:00-12:00M      *SDS Obstructive and restrictive diseases (MJC) – Group #1*

#### ***WEDNESDAY MARCH 14***

*Game Day*

#### ***THURSDAY MARCH 15***

8:00-9:00AM      Factors that Determine  $P_{ao_2}$  (MJC)  
9:00-10:00AM      Hypoxia (MJC)  
10:00-12:00M      **SGD** Case Study in Respiratory Physiology (Staff)

#### ***FRIDAY MARCH 16***

8:00–10:00      Regulation of Breathing (MJC)  
10:30-11:30AM      CLINICAL CORRELATION

### **WEEK 4**

#### ***MONDAY MARCH 19***

**9:00-11:00AM      PARTIAL EXAMINATION I- (70 Questions): 2 hours**

#### **RENAL PHYSIOLOGY**

#### ***TUESDAY MARCH 20***

8:00-9:00AM      The Nephron, GFR (NE)  
9:00-10:00AM      Clearance (NE)  
10:00-11:00M      *SDS Body Fluids (NE)*

**WEDNESDAY MARCH 21**

8:00-9:00AM	Tubular Transport Mechanisms (NE)
9:00-10:00AM	Sodium and Water Balance (NE)
10:00-11:00AM	<i>SDS Disturbances in Water Balance &amp; Sodium Regulation</i> (NE)
11:00-12:00M	<i>SDS Renal Hemodynamics</i> (NE)

**THURSDAY MARCH 22                      *Holiday***

**FRIDAY MARCH 23**

8:00-9:00AM	Sodium and Water Balance (NE)
9:00-10:00AM	Concentration and Dilution of Urine (NE)
10:00-12:00 m	<u>Movie: "Something the Lord Made"</u>

**WEEK 5**

**MONDAY MARCH 26**

8:00-9:00AM	Concentration and Dilution of Urine (NE)
9:00-10:00AM	Role of the Kidneys in A/B Balance (NE)
10:00-12:00M	<u>Discussion of the Movie and Humanistic Relevance</u> (AF)

**TUESDAY MARCH 27**

8:00-9:00AM	Role of the Kidneys in A/B Balance (NE)
9:00-10:00AM	Potassium Balance (NE)
10:00-12:00M	<b>SGD</b> Renal Physiology Case Study (Staff)

**WEDNESDAY MARCH 28**

8:00-9:00AM	Potassium Balance (NE)
9:00-10:00AM	Diuretics (NE)
10:00-11:00M	CLINICAL CORRELATION

**ACID-BASE PHYSIOLOGY**

**THURSDAY MARCH 29**

8:00-11:00AM	Acid Base Balance (MJC)
11:00-12:00AM	SDS Acid Base Disturbances

**GASTROINTESTINAL PHYSIOLOGY**

**FRIDAY MARCH 30**

8:00-9:00AM	Chewing and Salivary Secretion (WIS)
9:00-10:00AM	Swallowing and Vomiting (WIS)
10:00-12:00M	<b>SGD</b> Acid Base Case Study (Staff)

**WEEK 6**

**MONDAY APRIL 2**

8:00-9:00AM	Gastric Secretion and Motility (WIS)
9:00-10:00AM	Absorption of Water and Electrolytes (WIS)
10:00-11:00AM	<i>SDS Pancreatic secretion and small intestine</i> (WIS)
11:00-12:00M	<b>Quiz SGD 1-3 - Cardiovascular, Respiration, Renal and Labs 1 and 2</b>

**TUESDAY APRIL 3**

8:00-9:00AM	Digestion and Absorption of Carbohydrates (WIS)
9:00-10:00AM	Digestion and Absorption of Proteins and Fats (WIS)
10:00-11:00AM	<i>SDS Enterohepatic Circulation and Bile Acid Secretion</i> (WIS)

**WEDNESDAY APRIL 4**

8:00-9:00AM	Large intestine and the defecation reflex (WIS)
9:00-10:00AM	Large intestine and the defecation reflex (WIS)
10:00-12:00M	<b>SGD Case Study GI</b>

**THURSDAY APRIL 5**

***Holiday- JUEVES SANTO***

**FRIDAY APRIL 6**

***Holiday- VIERNES SANTO***

**WEEK 7**

**MONDAY APRIL 9**

**9:00AM TO 11:25M      PHYSIOLOGY PARTIAL EXAMINATION II (80 questions)  
(RENAL, A/B, GASTRO + CUMULATIVE): 2.25 hrs (135 min)**

**THERMOREGULATION**

**TUESDAY APRIL 10**

8:00-10:00AM	Mechanisms of Heat Transfer & Thermoregulation (CJ)
10:00-11:00M	SDS Mechanisms of Hormone Action (JM)

**ENDOCRINE PHYSIOLOGY**

**WEDNESDAY APRIL 11**

8:00-9:00AM	Introduction to Endocrine System and Hypothalamus (ACS)
9:00-10:00AM	Adenohypophysis and Feedback mechanisms (ACS)
10:00-11:00AM	SDS Chemistry of Hormones (ACS)

**THURSDAY APRIL 12**

8:00-9:00AM	Growth Hormone and Growth (ACS)
9:00-10:00 AM	Neurohypophysis: Oxitocin and Vasopressin (ACS)
10:00-11:00AM	CLINICAL CORRELATION: Pituitary Deficiencies



**FRIDAY APRIL 13**

8:00-9:00AM	Regulation of Thyroid Function (CT)
9:00-10:00AM	Physiological Effects of Thyroid Hormones (CT)
10:00-11:00AM	Calcium Homeostasis (CT)

**WEEK 8**

**MONDAY APRIL 16**

**HOLIDAY**

**TUESDAY APRIL 17**

8:00-8:30AM	Calcium Homeostasis
8:30-10:30AM	The Endocrine Pancreas (CT)
10:30-11:30AM	CLINICAL CORRELATION

**WEDNESDAY APRIL 18**

8:00-10:00AM	Adrenal Cortex and Medulla (ACS)
10:00-12:00AM	<b>SGD</b> Case Study in Endocrine Physiology (Staff)

**REPRODUCTIVE SYSTEM PHYSIOLOGY**

**THURSDAY APRIL 19**

8:00-9:00AM	Sexual differentiation and Puberty (ACS)
9:00-10:30AM	Male reproductive system
11:00-12:00AM	<b>SGD</b> Case Study in Reproductive Physiology (Staff)

**FRIDAY APRIL 20**

8:00-10:00AM	Female Reproductive System (ACS)
10:00-11:00M	CLINICAL CORRELATION –Dra. Josefina Romaguera

**WEEK 9**

**MONDAY APRIL 23**

8:00-9:00AM	Sexual behavior, Pregnancy (ACS)
9:00-10:00AM	Lactation, Menopause and Andropause (ACS)
10:00-11:00AM	CLINICAL CORRELATION – Dr. Alberto de la Vega

**EXERCISE PHYSIOLOGY**

**TUESDAY APRIL 24**

8:00- 9:00AM	"Exercise: Energetics and Physiological Responses" (WRF)
9:00-10:00AM	"Exercise: Energetics and Physiological Responses" (WRF)
10:00-11:00AM	CLINICAL CORRELATION (WRF)

11:30-12:00M      **Quiz SGD 5-7 – Gastrointestinal, Endocrine, Reproductive (Staff)**

WEDNESDAY APRIL 25

8:00- 10:00AM      HUMAN SIMULATOR (Staff)

THURSDAY APRIL 26

**SELF STUDY DAY**

FRIDAY APRIL 27

**9:00AM TO 11:30AM      *PHYSIOLOGY PARTIAL EXAMINATION III (90 Questions)***  
*(Endocrinology + Exercise + Reproduction + cumulative): 2.5 hr*

**MONDAY APRIL 30**

**9:00AM - 11:30AM      SELF STUDY DAY**

**TUESDAY MAY 1      PHYSIOLOGY FINAL EXAM-SHELF (125 questions)**

**TEACHING STRATEGIES:**

- LECTURE HOURS: 76 (54.2%)

- ACTIVE LEARNING ACTIVITIES: 53.5 HOURS (38.1%)

1. SMALL CASE- BASED GROUP DISCUSSIONS (SGDs): 13 HOURS
2. SELF DIRECTED GROUP DISCUSSIONS (SDSs): 20 HOURS
3. CLINICALLY ORIENTED LABORATORY PRACTICES: 4 HOURS
4. HIGH FIDELITY HUMAN SIMULATION EXERCISE: 2 HOURS
5. CLINICAL CORRELATIONS: 8 HOURS
6. SELF STUDY: 2.5 HOURS
7. MOVIE, DISCUSSION AND HUMANISTIC RELEVANCE: 4 HOURS

- EXAMS (9.25 HOURS) AND QUIZZES (1.5 HOURS): 10.75 HOURS (7.7%)

1. 3 CUMULATIVE PARTIAL EXAMS: 6.75 HOURS
2. 1 FINAL EXAM: 2.5 HOURS
3. 2 QUIZZES: 1.5 HOURS

***TOTAL COURSE HOURS: 140.25***

**ASSESSMENT STRATEGIES**

The students will be evaluated by means of:

- 3 partial examinations (75% of the grade),

- Final Exam (10% of the grade),
- Quizzes (10% of the grade),
- participation in SGD (5% of the grade).

## 1. EXAMS:

There will be 4 multiple choice exams (3 partial -1 final). They will count as 85% of the final grade. Exams II and III are cumulative. This means that they will cover material from past examinations.

EXAM I (Counts as 20% of the final grade)

Topics Covered:    Membrane Physiology  
                           Muscle Physiology  
                           Cardiovascular Physiology  
                           Respiratory Physiology.

Questions and Time: 70 multiple choice questions/ 2 hours

EXAM II (Cumulative: Counts as 25% of the final grade)

Topics Covered:    Renal Physiology  
                           Thermoregulation (SDS)  
                           Acid-Base Physiology  
                           Gastrointestinal Physiology  
                           + approximately 5% of questions from topics of exam I.

Questions and Time: 80 multiple choice questions/ 2.25 hours (135 min)

EXAM III (Cumulative: Counts as 30% of the final grade)

Topics Covered:    Endocrine Physiology  
                           Exercise Physiology  
                           Physiology of Reproduction  
                           Human Simulator Activity  
                           + 10% of questions from topics of exam I and II.

Questions and Time: 90 multiple choice questions/ 2.5 hours (150 min)

EXAM IV (FINAL EXAM)

Counts as 10% of the final grade.

Topics Covered: Comprehensive exam covering all topics of exams I, II and III.

Questions and Time: Approximately 125 multiple choice questions/ 2.5 hours.

## 2. PARTICIPATION IN THE CASE STUDIES (SGDs) AND SELF DIRECTED STUDIES (SDSs)

Case studies are small group learning experiences in which basic physiological concepts are discussed in a clinical context. They are carried out in groups of 10 to 12

students under the direction of a group leader. The cases allow students to see the relevance of the knowledge that they gain in class with the practice of medicine. There will be 7 cases during the 9 weeks duration of the Physiology course. The group leader evaluates student's performance following these criteria:

Presence and Alertness-----	25%
Preparation-----	25%
Evoked Participation-----	25%
Spontaneous Participation-----	25%

The total grade obtained from this evaluation will count as the 5% of the total grade.  
Participation in the case studies is mandatory.

### 3. Quizzes:

In addition, each SGD will be evaluated in quizzes that will contain questions pertaining to the specific topic of the SGD. These questions will be evaluated separately and count as 10% of the total grade. In other words, performance in each SGD will be evaluated by the SGD group leader subjective evaluation and the quiz objective evaluation.

The Humanistic component of the Physiology course will be evaluated as part of the SGD grade. Students will take a quiz related to the movie "Something the Lord Made" and the discussion generated after it by a specific panel of professors. This quiz will count as 50% of this Humanistic activity and the other 50% will be from an evaluation of an specific two paragraph assay related to the movie.

In summary, there will be 2 quizzes that will count 10% of the total grade.

**Quiz 1** (5% of the grade): Material covered in SGDs 1-3 ( #1-Cardiovascular, #2–Respiration, #3-Renal) and in the two laboratories (Lab 1 - *The electrocardiogram and blood pressure* and Lab 2 *Pulmonary volumes, capacities and mechanics*)

**Quiz 2** (5% of the grade): Material covered in SGDs 4-7 (#4-Acid/Base, #5-Gastrointestinal, #6-Endocrinology, #7-Reproduction and in the movie "Something the Lord Made".

The total grade obtained by the students in the case studies, laboratories and Humanistic activity related to the discussion of the movie will count as 15% of the course final grade. **Students who do not attend a case study, laboratory or the movie will receive a grade of 0% (zero).** If the student has a valid excuse for the absence, then he/she may be given the option of removing the grade of zero by taking a written test pertaining to the specific case study or arranging a discussion of the case with the professor of the specific section. **IMPORTANT: ATTENDANCE TO THE SGDs, MOVIE PRESENTATION AND LABORATORIES IS MANDATORY.** ARRIVING 30 MINUTES AFTER THE START OF A CASE DISCUSSION OR LABORATORY WILL BE CONSIDERED AN ABSENCE. ABSENCE TO **THREE** OR MORE CASE STUDIES (OR BOTH LABORATORIES) WITHOUT A VALID AND REASONABLE EXCUSE WILL BE DEEMED A FAILURE OR F IN THE WHOLE MPRI 7120 COURSE WITHOUT THE BENEFIT OF REPOSITION.

The SDSs are student directed activities designed to give the students the opportunity to work on their own and in small groups in specially designed active learning formats. The learning activities are based on prepared problems and reading material that the student must cover in a period of 1-2 hours. A discussion with the professor is optional and depends on the professor in charge. The activity may or may not be case based depending on the specific aim that needs to be accomplished. The material covered in SDSs will not be covered in lectures but will be part of the examination and is the sole responsibility of the student to make sure that he (she) has studied this material. It is in the student's best interest to utilize this period of active learning activities in the morning for the SDS when it is assigned. Failure to do so will only result in additional work for the independent study in the afternoons.

## GRADING SYSTEM

The final grade for the course will be calculated as follows:

$$\begin{aligned} & (\text{Exam I Score}) \times 0.20 \\ & + (\text{Exam II Score}) \times 0.25 \\ & + (\text{Exam III Score}) \times 0.30 \\ & + (\text{Final Exam Score}) \times 0.10 \\ & + (\text{Quizzes-SGDs, labs, movie}) \times 0.10 \\ & + (\text{SGD discussions}) \times 0.5 \end{aligned}$$

$$100\% = \text{Final Grade}$$

THE PASSING GRADE FOR THE MEDICAL PHYSIOLOGY COURSE MPRI 7120 WILL BE 70%.THE GRADING SYSTEM FOR THIS COURSE WILL BE AS FOLLOWS:

90%-100%	A
80%-89%	B
70%-79%	C
< 70%	F

**Reposition Exam:** If a student obtains less than seventy percent (70%) in any first year course, he/she may have the opportunity to take a reposition exam if established by the course faculty coordinator and/or department as described in the Policies and Guidelines for the Promotion of Medical Students. In order for a student to be allowed to take a reposition exam, he/she needs to have a cumulative average of at least 60 %. Any student with less than 60% will not be allowed to take a reposition exam. An F will be reported as the final grade for the given course. The due process will follow as established in the Policies and Guidelines for the Promotion of Medical Students.

A DEPARTMENTAL COMPREHENSIVE REPOSITION EXAM will be administered to those students who score less than 70% at the end of the course and have a cumulative average

of 60% or above. The exact date for this exam will be announced. In order to pass this reposition exam a student must score 70% or higher. THERE WILL BE NO ADJUSTMENTS APPLIED TO THE COMPREHENSIVE REPOSITION EXAM. STUDENTS TAKING AND PASSING THE COMPREHENSIVE REPOSITION EXAM WILL BE GIVEN A MAXIMUM GRADE OF "C" IN THE COURSE. If the student fails this examination test, the opportunity to take a reposition course will be evaluated. Reposition exams and remedial courses are a privilege offered to students after careful evaluation of individual circumstances.

AN ABSENCE TO ANY PARTIAL OR FINAL EXAM MUST BE ACCOMPANIED WITH AN APPROPRIATE JUSTIFICATION. UPON THE REVIEW OF THE JUSTIFICATION BY THE COURSE COORDINATOR AND ACCEPTANCE OF THE JUSTIFICATION BY THE DEPARTMENT, THE STUDENT MAY BE ALLOWED TO TAKE A MAKEUP EXAM AT A DATE ARRANGED WITH THE COORDINATOR.

NO STUDENT WILL BE ALLOWED TO TAKE A PARTIAL OR FINAL EXAM IF THE STUDENT ARRIVES 30 MINUTES AFTER THE START OF THE EXAMINATION. LATE ARRIVAL TO AN EXAM DOES NOT MEAN THAT THE STUDENT WILL BE ALLOWED TO REMAIN EXTRA TIME TO FINISH THE EXAM. THE STUDENT WILL HAVE ONLY THE REMAINING ALLOTTED TIME FOR THE EXAMINATION AND THE EXAM WILL BE COLLECTED AT THE END OF THE ESTABLISHED EXAM PERIOD.

THE STUDENT WILL HAVE 5 WORKING DAYS AFTER EACH PARTIAL EXAMINATION TO DISCUSS THE EXAM QUESTIONS WITH THE PROFESSORS. ALLEGATIONS REGARDING EXAM QUESTIONS WILL NOT BE ACCEPTED AFTER THIS PERIOD. ALLEGATIONS OF EXAM QUESTIONS ARE TO BE DISCUSSED DIRECTLY WITH THE PROFESSOR IN CHARGE OF PREPARING THE SPECIFIC QUESTIONS. THERE WILL BE NO DISCUSSIONS OF EXAMINATIONS IN CLASS.

**Policy of Video and/or Audio recording of class lectures:** Recording of class lectures is discretionary, the Physiology Department allows each professor in his/her own individual character to decide if his/her lectures may be recorded. If a student has any questions regarding this policy, they should approach the professor responsible for that particular section directly.

## **RESOURCES:**

### **1. Course Faculty:**

- Maria J. Crespo Ph.D. (MJC) Professor; (maria.crespo3@upr.edu)
- Nelson Escobales Ph.D. (NE) Professor & Chair; (nelson.escobales@upr.edu)
- Walter R. Frontera M.D., Ph.D. (WRF) Professor; (walter.frontera@upr.edu)
- Sabzali Javadov, PhD; Associate Professor; (sabzali.javadov@upr.edu)
- Carlos Jiménez-Rivera Ph.D. (CJ) Associate Professor; (carlos.jimenez8@upr.edu)
- Jorge D. Miranda Ph.D. (JDM) Associate Professor; (jorge.miranda3@upr.edu)

- Guido E. Santacana Ph.D. (GES) Professor; (guido.santacana1@upr.edu)
- Annabell C. Segarra Ph.D. (ACS) Professor; (annabell.segarra@upr.edu)
- Walter I. Silva Ph.D. (WIS) Professor; (walter.silva@upr.edu)
- Carlos Torres Ph.D. (CT) Assistant Professor; (carlos.torres27@upr.edu)

## **2. Collaborating Faculty:**

Miriam Allende, MD (MA), Professor and Chair of Endocrinology  
 Melvin Bonilla, MD (MB) Professor and Chair of Pediatrics  
 Enrique Carrión, MD (EC) Professor of Cardiology  
 Alberto de la Vega, MD (ADV) Professor of Obstetrics and Gynecology  
 Juan Gonzalez, MD (JG) Professor and Chair of Emergency Medicine  
 Lillian Haddock, MD (LH) Professor of Endocrinology  
 Angel Laureano, MD (AL) Professor of Pneumology  
 Roberto Negron, MD (RN) Chief Resident, Cardiology  
 Josefina Romaguera, MD (JR) Professor of Obstetrics and Gynecology  
 Phillip Specht Ph.D. (PS) Professor of Pharmacology  
 Dr. Tomassini, M.D., Professor of Gastroenterology

## **3. Teaching Assistants (Physiology PhD candidates):**

Francisco Arencibia  
 Yaria Arroyo  
 Nildris Cruz  
 Namyr Martinez  
 José Quidley  
 Adlin Rodríguez  
 María Carolina Rodriguez  
 Iris Salgado  
 Yvonne Torres  
 María Vélez

- |                               |   |
|-------------------------------|---|
| <b>4. Audiovisual:</b>        | Power Point Lectures and Turning Point (“clickers”)   |
| <b>5. Physical:</b>           | Amphitheater, multi-laboratory, and small group rooms |
| <b>6. Human Simulator:</b>    | High Fidelity Human Simulation                        |
| <b>7. Learning Materials:</b> | Professor’s Handouts and recommended books            |

### *Textbooks:*

Medical Physiology, Boron and Boulpaep, Second Edition, Elsevier, 2009

Cardiovascular Physiology, Berne and Levy. Ninth Edition. Mosby, 2007.

Respiratory Physiology: The Essentials, West, 7th Edition, Williams and Wilkins, 2006.

### *References:*

Berne and Levy Physiology. Koeppen and Stanton, Sixth Edition, 2010, Mosby Elsevier.

Physiology, Costanzo, Fifth Edition, 2011, Walters Kluwer/Lippincott Williams & Wilkins

Medical Physiology. Rhoades & Bell. Third Edition, 2009, Lippincott Williams & Wilkins.

Gastrointestinal Physiology, Johnson, 7th Edition, 2007, Mosby.

### Some websites of interest:

1) Cardiovascular Physiology: ([www.nda.ox.ac.uk/wfsa/html/u10/u1002\\_01.htm](http://www.nda.ox.ac.uk/wfsa/html/u10/u1002_01.htm))([www.cvphysiology.com](http://www.cvphysiology.com))

2) Respiratory Physiology: ([www.nda.ox.ac.uk/wfsa/html/u12/u1211\\_01.htm](http://www.nda.ox.ac.uk/wfsa/html/u12/u1211_01.htm)) ([www.acbrown.com](http://www.acbrown.com))

3) Gastrointestinal Physiology: ([http://physioweb.med.uvm.edu/gi\\_physiology/](http://physioweb.med.uvm.edu/gi_physiology/))

4) Endocrine Physiology: ([www.hormone.org](http://www.hormone.org)) ([www.endo-society.org](http://www.endo-society.org)) and ([www.endocrinology.org](http://www.endocrinology.org))

5) Reproductive Physiology

<http://www.nlm.nih.gov/medlineplus/femalereproductivesystem.html>

[http://en.wikibooks.org/w/index.php?title=Human\\_Physiology/The\\_female\\_reproductive\\_system&stable=0](http://en.wikibooks.org/w/index.php?title=Human_Physiology/The_female_reproductive_system&stable=0)

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## **REASONABLE ACCOMMODATION**

*Students with a health condition or situation that, according to the law, makes them eligible for reasonable accommodation have the right to submit a written application to the professor and the dean of their faculty, according to the procedures established in the document "submittal process for reasonable accommodation of the medical sciences campus". A free copy of this document may be obtained at the office of the dean for students affairs, second floor of the pharmacy building; phone 787-758-2525 ext. 5203. A copy may also be obtained at the office of the dean of medicine, as well as in the MSC web page. The application does not exempt students from complying with the academic requirements pertaining to the programs of the Medical Sciences Campus.*

## **ETHICAL ISSUES:**

Written examinations are the principal means utilized by the Department of Physiology to measure student's achievement of their educational experiences. It is our intention to guarantee that all students have an equal opportunity to demonstrate their academic achievement under the same circumstances; eliminating all possibility of unfair or unethical



behavior. We trust our students in their commitment to honesty and professional ethics; should unethical behavior be observed, appropriate and very rigorous disciplinary measures will be taken.

***Should knowledge become available that dishonesty regarding any particular examination has occurred; the faculty of the course reserves the right to cancel the examination before or after it has been administered and to require a repeat exam or to completely disregard the exam from the course evaluation.***

**DRESS CODE:** First year Medical students should follow the dress code that was approved on August 2007 and revised on November 2007 ([http://www.md.rcm.upr.edu/pdf/codigo\\_profesional\\_vestimenta.pdf](http://www.md.rcm.upr.edu/pdf/codigo_profesional_vestimenta.pdf)).